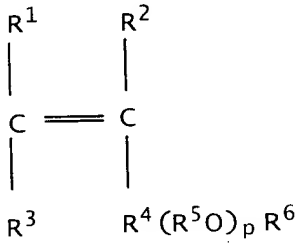
Claims

1. A cement additive comprising a polycarboxylic acid type copolymer and/or a salt thereof and a polyalkylene glycol derivative, wherein said polycarboxylic acid type copolymer contains at least one species of copolymer derived from at least an unsaturated polyalkylene glycol ether type monomer (A) and an unsaturated mono- or dicarboxylic acid type monomer (B) as its monomer component.

2. A cement additive according to claim 1, wherein the polycarboxylic acid type copolymer is additionally derived from an unsaturated polyalkylene glycol ester type monomer (C) and/or a monomer (D), which is copolymerizable with the above monomers (A) and (B), or with the monomers (A), (B) and (C).

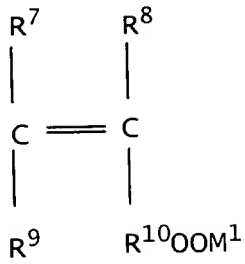
3. A cement additive according to claim 1 or 2, wherein the monomer (A) is a compound according to general formula (1):



(1

wherein R^1, R^2 and R^3 are each independently hydrogen or methyl, provided that not all are methyl; R^4 is $-CH_2O-$, $-(CH_2)_2O-$, $-C(CH_3)_2O-$ or $-O-$; the total carbon number of R^1, R^2, R^3 and R^4 is 3; R^5O is one or more species of C_2-C_4 oxyalkylene groups, and, in the case of two or more species, may be block or random; R^6 is hydrogen or a C_1-C_{22} alkyl, phenyl or C_1-C_{18} alkylphenyl group; p is an integer from on average 1 to 100,

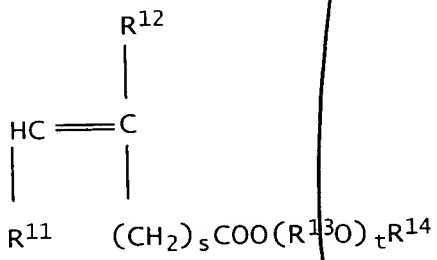
the monomer (B) is a compound according to general formula (2):



(2

wherein R^7 and R^8 are each independently hydrogen or methyl; R^9 is hydrogen, methyl or -$(CH_2)_qCOOM^2$; R^{10} is -$(CH_2)_r$-; q and r are each independently an integer from 0 to 2; M^1 and M^2 are a monovalent metal, a divalent metal, ammonium or an organic amine;

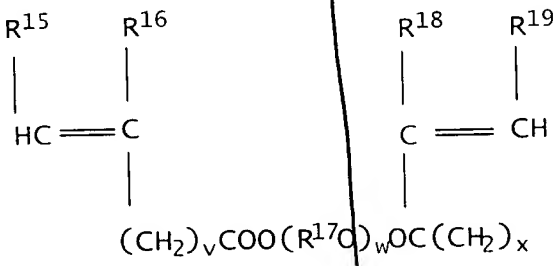
the monomer (C) is a compound according to general formula (3):



(3

wherein R^{11} and R^{12} are each independently hydrogen, methyl or $(CH_2)_uCOOM^3$, u is an integer from 0 to 2, M^3 is a monovalent metal, a divalent metal, ammonium or an organic amine; $R^{13}O$ is one or more species of C_2-C_4 oxyalkylene groups, and, in the case of two or more species, may be block or random; R^{14} is a C_1-C_{22} hydrogen or an alkyl, phenyl or C_1-C_{22} alkylphenyl group; s is an integer from 0 to 2; t is an integer an average from 1 to 300; and

the monomer (D) is a compound according to the following general formula (4):



(4

wherein R^{15}, R^{16}, R^{18} and R^{19} are each independently hydrogen or methyl, provided that not all are methyl; $R^{17}O$ is one or more species of C_2-C_4 oxyalkylene groups, and, in the case of two or more species, may be block or random; w is an integer an average from 1 to 300; v and x are each independently an integer from 0 to 2.

Sub A1)

4. A cement additive according to any one of claims 1-3, wherein the composition ratios of the monomers (A) and (B) in the polycarboxylic acid type copolymer are 30-100 mole % based on the total mole amount of their monomers, and the average molecular weight of said polycarboxylic acid type copolymer is from 3,000 to 100,000.

5. A cement additive according to any one of claims 1-3, wherein the average molecular weight of the polyalkylene glycol derivative is from 1,000 to 100,000, and in which the alkylene is one or more C_2-C_4 species, and the terminal group of the polyalkylene glycol is hydrogen, a C_1-C_{18} alkyl group or a phenyl group.

6. A cement additive according to any one of claims 1-5, containing 100 weight parts of the polycarboxylic acid type copolymer and 10-50 weight parts of the polyalkylene glycol derivative in the mixing proportion.

7. A cement additive according to any one of claims 1-6, wherein the amount used in a cementitious composition is such that the amount of polycarboxylic acid type copolymer to cement is 0.05-1.0 % by weight based on the weight of cement, and the amount of the polyalkylene glycol derivative to cement is 0.005-0.5 % by weight based on the weight of cement.

8. A high strength concrete mix, comprising a cement additive according to any one of claims 1-7.

9. A concrete mix for the production of articles by steam curing, comprising a cement additive according to any one of claims 1-7.

10. A method of preparation of a high-strength concrete mix, comprising the incorporation in the mix of a cement additive according to any one of claims 1-7.

SUB A2)

11. A method of preparation of a high-strength concrete mix, comprising the incorporation in the mix of a cement additive according to any one of claims 1-7.

ADD A3)